Abstract of the Disclosure

A method is described for determining a 2D gradient magnitude image from a range image of an object. The range image includes intensity values at pixel locations. The intensity values correspond to distances to a surface of the object. For each pixel (i,j) in the range image, a horizontal central difference *dx* value and a vertical central difference *dy* value are determined. Then, the 2D gradient magnitude image value at each pixel (i,j) is set to $0.5 * \mathrm{sqrt}(dx^2 + dy^2 + 4)$. The range image can be scaled so that a unit intensity value at each pixel corresponds to a unit distance value. The magnitude of a gradient at a 3D point **p** can then be determined from the scaled range image and the gradient magnitude image. First, a perpendicular projection (x,y) of **p** onto the scaled range image is computed. Next, a gradient magnitude at (x,y) is interpolated from the corresponding values of the 2D gradient magnitude image near the location (x,y). Finally, the magnitude of the gradient at **p** is set to the interpolated gradient magnitude at (x,y).